State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

Montpelier, Vermont 05602
DEPARTMENT OF FORESTS AND PARKS

Central Vermont District
RD #1
Morrisville, Vermont 05661

December 14, 1977

Department of Fish and Game
Department of Forest and Parks
Department of Water Resources
Environmental Board
Division of Environmental Engineering
Division of Environmental Protection
Division of Recreation
Division of Planning
Natural Resources Conservation Council

4

Parker Snowden
USFS - S&P Forestry
80 Daniel Street
Federal Building
Portsmouth, New Hampshire 03810

Dear Parker:

Enclosed is the Vermont Insect and Disease Report for 1977 that you requested. Please keep in mind that this is the first draft which I compiled from reports that Gene Keenan and I wrote. Brent has not reviewed it yet.

If you have any questions, please feel free to contact me directly at (802) 888-4607. I hope to see you again one of these days.

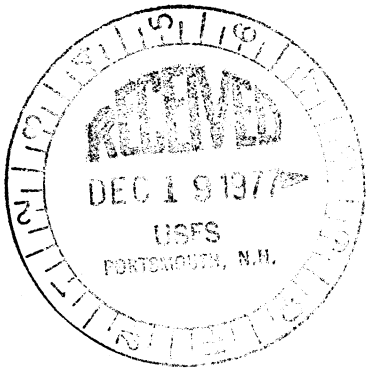
Sincerely,

Ron Kelley

Ronald S. Kelley
Forest Insect & Disease Specialist

RSK:bs
Encl.

cc: H. Brent Teillon



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AGENCY OF ENVIRONMENTAL CONSERVATION
Department of Forests, Parks and Recreation

STATE OF VERMONT

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FOREST INSECT AND DISEASE CONDITIONS
Calendar Year 1977

Prepared by Forest Resource Protection

H. Brent Teillon
Ronald S. Kelley
Eugene E. Keenan

VERMONT

FOREST INSECT AND DISEASE CONDITIONS REPORT
1977

INTRODUCTION

The information in this report is based on two special aerial surveys made in mid-summer and a partial annual statewide survey made in late summer, plus field observations made by Forest Resource Protection personnel. An abundance of inclement weather in late August and early September made completion of the annual aerial survey impossible.

A hot dry spring for the second year in a row proved to be very favorable for hatching success and survival of most insects and resulted in population increases for many of our forest insects.

FOREST INSECTS

Hardwood Defoliators

Gypsy Moth, Porthetria dispar, populations increased for the second year in a row, despite a population decline in many areas previously infested. A total of 7,680 acres in Franklin, Chittenden, Addison, and Rutland Counties were found to be heavily defoliated. Much of the increased defoliation occurred in Chittenden County where many white pines were completely defoliated along with the hardwoods. Most of the pines are expected to die. Light defoliation was common throughout western Rutland and Bennington counties, where egg mass counts indicate a high population density for 1978.

In areas of declining populations, much of the decrease was attributed to poor hatching success this spring. One such areas was North Hero State Park on Grand Isle. The park had suffered heavy defoliation for the past two seasons but little spraying around campsites was required this year. Gypsy moth larvae in another area of declining populations in Swanton visited during pupation were found to be heavily infected with wilt disease and Brachymerid pupal parasites were abundant.

Forest Tent Caterpillar, Malacosoma disstria, populations continued to increase dramatically this year, with outbreaks being recorded as far north as Duxbury. Defoliation predictions for 1977 based on 1976 egg mass surveys proved correct, as heavy defoliation in Rutland and Windsor counties exploded from 4500 acres in 1976 to 25000 acres in 1977. This year, defoliation occurred in Addison, Orange, and Washington counties as well. A total of 31,120 acres of heavy defoliation was observed in aerial surveys throughout the five counties affected.

The high incidence of wilt disease found in the 1976 Stockbridge infestation had little effect in reducing spread. Parasites and predators observed this year were not abundant enough to reduce tent caterpillar populations. An examination of 650 pupae from the Duxbury infestation revealed that 61% of the pupae had been parasitized and another 18% failed to produce any adults for other reasons, while 21% produced adult tent caterpillars. An egg mass survey

conducted in this area predict noticeable defoliation here again next year.

Sequential egg mass sampling plots were established throughout affected areas this year. For Rutland and Windsor counties, 128 of the 227 plots taken indicate that noticeable defoliation is expected in 1978. All 20 plots established in the towns of Benson and West Haven in Rutland County indicate noticeable defoliation for 1978, while 8 out of 9 plots in Orwell (Addison County) predict noticeable defoliation in 1978.

Maple Leaf Cutter, Paraclemensia acerifoliella populations decreased in many of the older infestations but new infestations resulted in an overall increase in acreage defoliated. Rainy weather prevented all the leaf cutter damage from being aerially mapped, but assuming stable defoliation acreage for areas not mapped, a total of 42,000 acres were heavily defoliated by this insect in 1977. This acreage encompasses all counties in the state except Essex and Orleans, where only light numbers of the insect have been detected. Increasing populations were reported for Rutland, Windsor, Windham, and Orange counties.

Spring pupal collections from a sugarbush which had received heavy defoliation for the previous four seasons revealed that the mean number of dead pupae averaged 44% compared to 37% for the same area in 1976. About 3% of the pupal cases contained predator larvae, while 41% of the pupae were diseased. The predominant fungus associated with diseased pupae has been tentatively identified as an Isaria sp. A sample of the fungus was sent to an insect pathologist for further identification. As in 1976, pupal disease in this location was not sufficient to result in any reduction in defoliation damage.

Since the registration of carbaryl for use against the maple leaf cutter remains questionable, forest resource protection and University of Vermont personnel began a cooperative project to generate efficacy and tolerance data for the insecticide Orthene. On July 6, 120 acres of sugar maple in Orange County were experimentally sprayed with Orthene forest spray to obtain efficacy data for the control of maple leaf cutter. The Orthene was aerially applied at the rates of 1/4 lb. and 1/2 lb. of active ingredient per acre, with 3 replicates per formulation. Results are still in progress but control appeared to be only fair.

Two heavily infested sugar maple orchards totalling 52 acres in the towns of Sharon and Hartland were sprayed under a specific exemption issued by E.P.A. Sevin 80-S was applied by fixed-wing aircraft at 1 lb. per acre for a total cost of about 7 dollars per acre. This resulted in a population reduction of 86 percent.

A solitary leaf roller, Sparganothis pettitana, caused somewhat less damage in the 836 acres in Orleans, Lamoille, and Washington Counties reported moderately defoliated in 1976 but increased in other areas, particularly in Rutland County. The insect was found to be widely distributed throughout the state in light numbers and was especially noticeable in sugarbushes.

Birch Leaf Miner, Fenusa pusilla, damage to grey and white birch remained heavy statewide but homeowner complaints on this insect decreased this year.

Elm Leaf Beetle, Pyrrhalta luteola, populations were down about 50 percent from last year in Addison County, with light to moderate damage occurring in Vergennes and Middlebury. Extensive elm defoliation was reported for other urban areas in Southern Vermont.

Greenstriped Mapleworm, Anisota rubicunda, was reported causing light to moderate defoliation on about 50 acres of a northern hardwood stand in Waitsfield.

Maple Trumpet Skeletonizer, Epinotia aceriella, was again present throughout the region in light numbers. It was sometimes encountered as the most abundant insect present in sugarbushes surveyed for maple decline.

Spring cankerworm, Paleacrita vernata, was detected in light numbers in a 50 acre sugarbush in Huntington.

Fall Cankerworm, Alsophila pometaria, was again detected in light numbers in the western portions of Rutland and Bennington counties but with no noticeable defoliation.

Fall Webworm, Hyphantria cunea, was evident throughout the state. Numbers in northern Vermont were lighter than during the past two years while heavy roadside populations were noticed further south in Bennington, Rutland, and Windham counties. Defoliation was heavy along I-91 and within the towns of Chester and Gassetts.

Locust Leaf Miner, Xenochalepus dorsalis, caused heavy defoliation of scattered locust trees on about 10 acres in Richmond for the second year in a row.

Mountain Ash Sawfly, Pristophora geniculata, caused heavy defoliation of scattered ornamental trees.

Satin Moth, Stilpnotia salicis, caused some defoliation of shade poplars, especially in the southwestern portion of Rutland County.

Eastern Tent Caterpillar, Malacosoma americanum population density was high throughout Rutland, Windsor, Bennington, and Windham counties. Egg masses observed indicate an increase in population in 1978.

Saddled Prominent, Heterocampa guttivita was detected only in trace amounts in Chelsea, Middletown Springs, and Sunderland. No defoliation was observed.

Spiny-elm Caterpillar, Nymphalis antiopa feeding activity was sporadic. Larvae collected were found to be heavily parasitized by Diptera.

Hickory Tussock Moth, Halisidata caryae, defoliation of butternut resulted in numerous complaints throughout Rutland, Windsor, Windham, and Bennington counties.

Lithocolletis aceriella, a leaf miner, was common on sugar maple understory again this year but caused no serious damage.

Orangehumped Mapleworm, Symmerista leucitys, was responsible for moderate defoliation of sugar maple on 40 acres in East Burke and 25 acres in Ryegate.

The following potentially serious defoliators were not detected this year: Bruce Spanworm, Operophtera bruceata; Large Aspen Tortrix, Choristoneura conflictana; Linden Looper, Erranis tiliaria.

Softwood Defoliators

Spruce Budworm, Choristoneura fumiferana, damage increased this year in the northeastern part of the state. A total of 44,000 acres of moderate to heavy defoliation of balsam fir and spruce in Essex, Orleans, and Caledonia counties were mapped during a special aerial survey. In a few areas, trees have suffered several years in a row of heavy feeding damage but no mortality has yet been observed.

Of 60 pupae collected from a moderately defoliated area in Sutton and reared in the laboratory, 27% yielded a Hymenopteran pupal parasite, Ephialtes ontario and 5% yielded a Dipteran parasite of last instar larvae, Phyrxe sp. This is a much higher parasitism rate by Ephialtes than is common in Maine and deserves further investigation in 1978. Of the remaining pupae, 32% produced adult budworms and 36% failed to produce adults or parasites.

Most spruce-fir stands in the region outside of the areas of noticeable damage have at least a trace of defoliation. Christmas tree damage was not heavy except for trees adjacent to heavily infested spruce-fir stands. Sampling for overwintering larvae is planned for later this year to evaluate population levels for next year.

Larch Sawfly, Pristophora erichsonii, populations continued to cause heavy defoliation of 58 acres of larch in Chittenden and Washington counties. The University of Vermont had 25 acres of Japanese larch in Jericho aerially sprayed with Sevin on June 14 to control the insect, with good results. The plantation had suffered two years in a row of heavy defoliation.

Red-headed Pine Sawfly, Neodiprion lecontei colonies were difficult to find this year. The only heavy defoliation damage reported was on about 5 acres of pole size red pine in Milton.

Introduced Pine Sawfly, Diprion similis, was detected in trace amounts on white pine.

Yellow-headed Spruce Sawfly, Pikonema alaskensis, larvae were evident only in trace amounts this year.

Larch Casebearer, Coleophora laricella, was present in light numbers in the state seed orchard in Moscow but did not cause any significant damage. An increase in casebearer populations was noticed in Wallingford and Mendon.

Pine Needle Midge, Contarinia baeri, populations appeared to be only light to moderate over much of the 190 acres of Scotch pine in northern Vermont reported infested in 1976. Damage to a 100 acre plantation in Holland which had been heavily infested in 1976 remained heavy.

Balsam Gall Midge, Dasineura balsamicola, populations generally decreased, causing a light to moderate drop of 1977 foliage over most of the 325 acres of sheared balsam fir Christmas trees reported attacked in 1976. One grower had 15 acres of heavily infested trees aerially sprayed with Diazinon AG 500 at the rate of 1 lb. active ingredient in 3 gallons of water per acre. This resulted in about a 60 percent reduction in the number of galled needles. Cost of treatment totaled about 11 dollars per acre. Damage to a nearby 5 acre plantation of balsam fir that he left untreated increased from heavy to severe. Light infestations of gall midge were reported in 30 acres of previously uninfested Christmas trees in Caledonia and Lamoille counties.

The use of yellow and clear plexiglass sticky traps (15cm square) to monitor adult emergence for the second year worked well in predicting 1977 damage in two plantations considered for spray operations. Number of adults per square centimeter for yellow and clear traps averaged 0.31 and 0.16, respectively, for plantation #1 and 0.69 and 0.40, respectively, for plantation #2. Spraying for gall midge was not recommended for plantation #1 and 1977 damage decreased to light here, while plantation #2 later received the aerial application of diazinon.

White Pine Sawfly, Neodiprion pinetum, was not detected this year.

Aphids and Scale Insects

Balsam Woolly Aphid, Adelges piceae, damage remains stable overall, with balsam fir mortality occurring on 18000 acres statewide. A population increase was noticed in Mendon. A salvage operation is continuing within the Rutland City Municipal Forest.

Balsam Twig Aphid, Mindarus abietinus, damage occurred in virtually every balsam fir Christmas tree plantation in the state this year. Moderate to heavy damage was actually observed on about 400 acres. A couple of growers had their plantations aerially sprayed with dimethoate (Cygon 2E) at 1 lb. per acre to reduce twig aphid damage. Total cost of treatment was about 15 dollars per acre. Postreatment samples from one 20 acre plantation so treated showed an 83 percent reduction in the number of aphids due to treatment. Heavy damage occurred in 1977 in plantations where egg counts in late 1976 revealed 15 to 30 eggs per 10 centimeter twig tip.

Spruce Gall Aphids, Adelges spp., continue to cause heavy damage to Norway, white, and red spruce in Rutland County.

Pine Bark Aphid, Pineus strobi, was found to be causing branch mortality on young white pines in Castleton and Fair Haven.

A root aphid, Prociphilus americanus, was found to be causing chlorosis and stunting of balsam fir seedlings in Hardwick. The same aphid had been

found to be damaging balsam fir nursery stock in Johnson in 1976 and was identified as P. americanus by the Systematic Entomology Laboratory in Beltsville, Maryland. Publications indicate that ash is the primary host for the insect and fir roots are a secondary host.

Hickory Gall Aphid, Phylloxera caryaecaulis, caused scattered light hickory twig mortality with the exception of an infestation in Sudbury where twig mortality in open grown hickories was very evident.

Bud, Shoot, and Stem Insects

White Pine Weevil, Pissodes strobi, continues to damage white pine and spruce throughout the state. About 50 acres of Norway, white and blue spruce in scattered locations were noticed to be heavily damaged this year. One 2 acre plantation of Norway spruce in Craftsbury had about 50 percent of its trees weeviled.

Pales Weevil, Hylobius pales, was found to be causing extensive twig mortality in a 5 acre Scotch pine plantation in Morristown and lesser damage to Scotch pine in other plantations in the region.

Pine Shoot Borers, probably Eucosma gloriola, were found to be causing scattered shoot damage to red and Scotch pines throughout the state.

A yellow birch leaf petiole weevil, Pseudanthomus sp., probably P. validus, continues to cause noticeable leaf browning in Bennington and Windham counties.

FOREST DISEASES

Stem Diseases

Beech Bark Disease (Cryptococcus fagi - Nectria coccinea var. faginata): This insect and disease complex continues to cause heavy beech mortality throughout the state. The Forest Resources of Vermont 1977 report lists the annual mortality of sawtimber size beech as exceeding 12 million board feet.

White Pine Blister Rust (caused by Cronartium ribicola) infection rates appear to be at low levels overall. One exception is a 17 acre stand of white pine in Moretown that exhibited numerous recent infections. Ribes control work was requested for this stand, as well as for two others, for a total of 25 acres. No control work has yet been conducted due to other priorities.

Woodgate Gall Rust, caused by Peridermium harknessii, was found to be causing branch dieback and some mortality of Scotch pine trees in scattered locations in northern Vermont. About 50 acres were observed to be moderately infected with the disease.

Dutch Elm Disease infections caused by Ceratocystis ulmi were very noticeable throughout the state this year. Some municipalities are expressing an interest in replacing diseased and dead elms with suitable alternative species.

Red Ring Rot due to Phellinus (Fomes) pini has been identified as the cause of white pine heartrot in Mendon and Fair Haven. Salvage operations are now underway in the stands affected.

Septoria Canker, caused by Septoria musiva, was found to be infecting poplars in Bennington and Rutland counties.

Cytospora Canker, caused by Cytospora kunzei is causing branch dieback and occasional mortality of ornamental blue spruce. Salvage operations have been completed on 15 acres of infected Norway spruce in Mendon.

Scleroderris Canker, caused by Gremmeniella abietina, has now been found infecting red and Scotch pine in many new locations in northern Vermont. It was recently discovered that a European strain of the fungus is present in the Northeast which kills much larger trees than the Lake States strain and is responsible for the death of pines up to 60 years old in New York State. A culture of the fungus from our Greensboro infection site was sent to USFS researchers for temperature and serological tests. These tests showed it to be the European strain. Because of the threat of this new strain to our red pine plantings and the Scotch pine Christmas tree industry, our division joined with Vermont Department of Agriculture personnel to eradicate our two known infection centers. We began this spring by cutting and burning all susceptible species within 8 acres of red and Scotch pine in Belvidere originally discovered in 1971. This was completed this fall by the use of a bulldozer. Infected Scotch pines in Greensboro (5 acres) were uprooted by a bulldozer and then buried. In the meantime, a USFS survey crew discovered three more infection centers in northern Vermont. With a little looking, we located several more areas, including a 20 year old red pine plantation in Wolcott where several trees 20-30 feet tall have been killed by the disease.

To reduce spread of the disease, a joint quarantine was issued by our Department and the Vermont Department of Agriculture, effective September 30 to prohibit shipment of susceptible material outside the quarantined area unless inspected and certified free of the disease. The quarantine area presently includes all of Lamoille County and several towns in Caledonia, Orleans, Franklin and Washington Counties. Under provisions of the quarantine, over 50 Scotch pine and spruce Christmas tree plantations were inspected and numerous branch samples collected for culturing. The disease was not found to be present in any of the managed Christmas tree plantations inspected. In addition, a federal quarantine on Scleroderris went into effect October 18 and federal inspectors are surveying other Northeastern states for the disease.

A complete survey of all red and Scotch pine in the state is now in progress to determine the full extent of the disease. At present, there are 28

plantations in northern Vermont known to be infected, 20 of which are in Lamoille County. These plantations comprise about 350 acres of red and Scotch pine but only 20 of these acres contain tree mortality.

Foliage Diseases

Lophodermium Needle Cast, caused by Lophodermium pinastri, increased in Scotch pine Christmas tree plantations this year, probably due to last year's wet weather. Two new infected plantations were located in Rutland and Pittsford. An extremely wet August and September this year will probably result in even more infection appearing next year. Some growers continue to reduce the damage by periodic applications of fungicides.

Sycamore Anthracnose, caused by Gnomonia veneta, was very light on sycamores which had received heavy damage in previous years.

Maple Anthracnose, caused by Gloeosporium apocrytum, was light on maples throughout the state.

Root Rots

Fomes Root Rot, caused by Fomitopsis annosa is suspected of killing red pine in a new location in Moretown. Established infection centers in red pine plantations in Rutland, Chester, Rockingham, and Brattleboro continue to enlarge. One infected 8 acre red pine stand in Hardwick underwent stump treatment with borax during logging operations in the spring.

Shoestring Root Rot, caused by Armillariella mellea, was found to be associated with mortality of large pole size red pines on an acre of the Essex Municipal Forest. A. mellea was also associated with declining red spruce in Underhill as well as elsewhere in the state. Sugar maples in stands repeatedly defoliated over the past 5 years were found to have a high incidence of infection by this organism.

Diebacks, Declines, and Environmental Diseases

A Maple Decline Survey was conducted this year to determine the extent of sugar maple decline in the state and record some of the factors that might be associated with decline. Questionnaires concerning decline were sent to all listed sugarbush owners. Sugarbushes of those indicating a problem as well as random samples of remaining bushes were selected to be surveyed. Twelve technicians were hired with CETA funds to assist in the survey. Over 300 sugarbushes were intensively surveyed in the state and the data has been transferred to computer forms for later analysis.

Ash dieback remains noticeable in many areas of Addison County, especially within grazed farm woodlots. It was also very evident in the town of Grafton in Windham County.

Larch decline and mortality continued on the 232 acres that were discovered in 1976.

Spruce continues to die on large acreage in many locations. Armillariella mellea is frequently associated with the dying trees but it may be acting as a secondary pathogen. The actual cause of the decline remains largely unknown, though it may be related to the high susceptibility of spruce to winter injury.

Winter injury of conifers was very evident this year following mild weather in late winter. Some Scotch pine Christmas trees on sandy exposed sites were killed as a result of the evaporation of water which could not be replaced by frozen root systems.

Leaf scorch was extremely heavy on roadside maples and elms in the Champlain Valley due to very dry spring weather.

Animals

Mice populations continued to remain at low levels this year, with no complaints being received.

Porcupine damage remains low overall, with only occasional complaints and requests for control work.